



Multi-access Edge Computing (MEC); Edge Platform Application Enablement

STANDARD PREVIEW
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ReferenceRGS/MEC-0011v221Plat.App.Enab

KeywordsAPI, MEC

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Contents

Intellectual Property Rights	8
Foreword.....	8
Modal verbs terminology.....	8
1 Scope	9
2 References	9
2.1 Normative references	9
2.2 Informative references.....	10
3 Definition of terms, symbols and abbreviations.....	11
3.1 Terms.....	11
3.2 Symbols.....	11
3.3 Abbreviations	11
4 Overview	11
5 Description of the services (informative).....	12
5.1 Introduction	12
5.2 Sequence diagrams	12
5.2.1 General.....	12
5.2.2 MEC application start-up.....	13
5.2.3 MEC application graceful termination/stop.....	15
5.2.4 Service availability update and new service registration	15
5.2.5 Service availability query	17
5.2.6 Managing subscription to event notifications.....	17
5.2.6.1 Introduction.....	17
5.2.6.2 Subscribing to event notifications.....	18
5.2.6.3 Unsubscribing from event notifications.....	18
5.2.7 Traffic rule activation/deactivation/update	19
5.2.8 DNS rule activation/deactivation.....	19
5.2.9 Transport information query	20
5.2.10 Time of Day (ToD).....	20
5.2.10.1 Introduction.....	20
5.2.10.2 Get platform time.....	20
5.2.10.3 Timing capabilities query flow	21
5.2.11 Service deregistration	21
5.2.12 Service heartbeat.....	22
6 Common data types	22
6.1 Introduction	22
6.2 Resource data types	22
6.2.1 Introduction.....	22
6.2.2 Type: SubscriptionLinkList	22
6.3 Referenced structured data types.....	23
6.3.1 Introduction.....	23
6.3.2 Type: LinkType	23
7 MEC application support API.....	23
7.1 Data model	23
7.1.1 Introduction.....	23
7.1.2 Resource data types	23
7.1.2.1 Introduction.....	23
7.1.2.2 Type: TrafficRule.....	23
7.1.2.3 Type: DnsRule	24
7.1.2.4 Type: TimingCaps.....	24
7.1.2.5 Type: CurrentTime.....	25
7.1.3 Subscription data types	26
7.1.3.1 Introduction.....	26

7.1.3.2	Type: AppTerminationNotificationSubscription.....	26
7.1.4	Notification data types	26
7.1.4.1	Introduction	26
7.1.4.2	Type: AppTerminationNotification.....	26
7.1.4.3	Type: AppTerminationConfirmation	27
7.1.4.4	Type: AppReadyConfirmation.....	27
7.1.5	Referenced structured data types	27
7.1.5.1	Introduction.....	27
7.1.5.2	Type: TrafficFilter.....	27
7.1.5.3	Type: DestinationInterface.....	28
7.1.5.4	Type: TunnelInfo	28
7.1.6	Referenced simple data types and enumerations	29
7.2	API definition.....	29
7.2.1	Introduction.....	29
7.2.2	Global definitions and resource structure	29
7.2.3	Resource: all mecAppSupportSubscription	31
7.2.3.1	Description	31
7.2.3.2	Resource definition	31
7.2.3.3	Resource methods	31
7.2.3.3.1	GET	31
7.2.3.3.2	PUT	32
7.2.3.3.3	PATCH.....	32
7.2.3.3.4	POST	32
7.2.3.3.5	DELETE.....	33
7.2.4	Resource: individual mecAppSupportSubscription.....	33
7.2.4.1	Description	33
7.2.4.2	Resource definition	33
7.2.4.3	Resource methods	33
7.2.4.3.1	GET	33
7.2.4.3.2	PUT	34
7.2.4.3.3	PATCH.....	34
7.2.4.3.4	POST	34
7.2.4.3.5	DELETE.....	34
7.2.5	Resource: mecTimingCaps	35
7.2.5.1	Description	35
7.2.5.2	Resource definition	35
7.2.5.3	Resource methods	36
7.2.5.3.1	GET	36
7.2.5.3.2	PUT	36
7.2.5.3.3	PATCH.....	36
7.2.5.3.4	POST	37
7.2.5.3.5	DELETE.....	37
7.2.6	Resource: mecCurrentTime	37
7.2.6.1	Description	37
7.2.6.2	Resource definition	37
7.2.6.3	Resource methods	37
7.2.6.3.1	GET	37
7.2.6.3.2	PUT	38
7.2.6.3.3	PATCH.....	38
7.2.6.3.4	POST	38
7.2.6.3.5	DELETE.....	38
7.2.7	Resource: all mecTrafficRule	38
7.2.7.1	Description	38
7.2.7.2	Resource definition	38
7.2.7.3	Resource methods	39
7.2.7.3.1	GET	39
7.2.7.3.2	PUT	39
7.2.7.3.3	PATCH.....	39
7.2.7.3.4	POST	39
7.2.7.3.5	DELETE.....	39
7.2.8	Resource: individual mecTrafficRule	39
7.2.8.1	Description.....	39

7.2.8.2	Resource definition	40
7.2.8.3	Resource methods	40
7.2.8.3.1	GET	40
7.2.8.3.2	PUT	40
7.2.8.3.3	PATCH	41
7.2.8.3.4	POST	42
7.2.8.3.5	DELETE	42
7.2.9	Resource: all mecDnsRule	42
7.2.9.1	Description	42
7.2.9.2	Resource definition	42
7.2.9.3	Resource methods	42
7.2.9.3.1	GET	42
7.2.9.3.2	PUT	43
7.2.9.3.3	PATCH	43
7.2.9.3.4	POST	43
7.2.9.3.5	DELETE	43
7.2.10	Resource: individual mecDnsRule	43
7.2.10.1	Description	43
7.2.10.2	Resource definition	43
7.2.10.3	Resource methods	44
7.2.10.3.1	GET	44
7.2.10.3.2	PUT	44
7.2.10.3.3	PATCH	45
7.2.10.3.4	POST	45
7.2.10.3.5	DELETE	45
7.2.11	Resource: confirm termination task	45
7.2.11.1	Description	45
7.2.11.2	Resource definition	45
7.2.11.3	Resource methods	46
7.2.11.3.1	GET	46
7.2.11.3.2	PUT	46
7.2.11.3.3	PATCH	46
7.2.11.3.4	POST	46
7.2.11.3.5	DELETE	47
7.2.12	Resource: confirm ready task	47
7.2.12.1	Description	47
7.2.12.2	Resource definition	47
7.2.12.3	Resource methods	48
7.2.12.3.1	GET	48
7.2.12.3.2	PUT	48
7.2.12.3.3	PATCH	48
7.2.12.3.4	POST	48
7.2.12.3.5	DELETE	49
8	MEC service management API	49
8.1	Data model	49
8.1.1	Introduction	49
8.1.2	Resource data types	49
8.1.2.1	Introduction	49
8.1.2.2	Type: ServiceInfo	49
8.1.2.3	Type: TransportInfo	50
8.1.2.4	Type: ServiceLivenessInfo	51
8.1.2.5	Type: ServiceLivenessUpdate	51
8.1.3	Subscription data types	51
8.1.3.1	Introduction	51
8.1.3.2	Type: SerAvailabilityNotificationSubscription	52
8.1.4	Notification data types	52
8.1.4.1	Introduction	52
8.1.4.2	Type: ServiceAvailabilityNotification	52
8.1.5	Referenced structured data types	53
8.1.5.1	Introduction	53
8.1.5.2	Type: CategoryRef	53

8.1.5.3	Type: EndPointInfo	53
8.1.5.4	Type: SecurityInfo	54
8.1.6	Referenced simple data types and enumerations	55
8.1.6.1	Introduction	55
8.1.6.2	Simple data types	55
8.1.6.3	Enumeration: SerializerType	55
8.1.6.4	Enumeration: TransportType	55
8.1.6.5	Enumeration: LocalityType	55
8.1.6.6	Enumeration: ServiceState	56
8.2	API definition	56
8.2.1	Introduction	56
8.2.2	Global definitions and resource structure	56
8.2.3	Resource: a list of mecService	58
8.2.3.1	Description	58
8.2.3.2	Resource definition	58
8.2.3.3	Resource methods	58
8.2.3.3.1	GET	58
8.2.3.3.2	PUT	59
8.2.3.3.3	PATCH	59
8.2.3.3.4	POST	60
8.2.3.3.5	DELETE	60
8.2.4	Resource: individual mecService	60
8.2.4.1	Description	60
8.2.4.2	Resource definition	60
8.2.4.3	Resource methods	60
8.2.4.3.1	GET	60
8.2.4.3.2	PUT	61
8.2.4.3.3	PATCH	61
8.2.4.3.4	POST	61
8.2.4.3.5	DELETE	61
8.2.5	Resource: a list of mecTransport	61
8.2.5.1	Description	61
8.2.5.2	Resource definition	61
8.2.5.3	Resource methods	62
8.2.5.3.1	GET	62
8.2.5.3.2	PUT	62
8.2.5.3.3	PATCH	63
8.2.5.3.4	POST	63
8.2.5.3.5	DELETE	63
8.2.6	Resource: a list of mecService of an application instance	63
8.2.6.1	Description	63
8.2.6.2	Resource definition	63
8.2.6.3	Resource methods	63
8.2.6.3.1	GET	63
8.2.6.3.2	PUT	65
8.2.6.3.3	PATCH	65
8.2.6.3.4	POST	65
8.2.6.3.5	DELETE	66
8.2.7	Resource: individual mecService of an application instance	66
8.2.7.1	Description	66
8.2.7.2	Resource definition	66
8.2.7.3	Resource methods	66
8.2.7.3.1	GET	66
8.2.7.3.2	PUT	67
8.2.7.3.3	PATCH	68
8.2.7.3.4	POST	68
8.2.7.3.5	DELETE	68
8.2.8	Resource: all mecSrvMgmtSubscription	69
8.2.8.1	Description	69
8.2.8.2	Resource definition	69
8.2.8.3	Resource methods	69
8.2.8.3.1	GET	69

8.2.8.3.2	PUT	70
8.2.8.3.3	PATCH	70
8.2.8.3.4	POST	70
8.2.8.3.5	DELETE	71
8.2.9	Resource: individual mecSrvMgmtSubscription	71
8.2.9.1	Description	71
8.2.9.2	Resource definition	71
8.2.9.3	Resource methods	72
8.2.9.3.1	GET	72
8.2.9.3.2	PUT	72
8.2.9.3.3	PATCH	72
8.2.9.3.4	POST	72
8.2.9.3.5	DELETE	72
8.2.10	Resource: individual mecServiceLiveness	73
8.2.10.1	Description	73
8.2.10.2	Resource definition	73
8.2.10.3	Resource methods	74
8.2.10.3.1	GET	74
8.2.10.3.2	PUT	74
8.2.10.3.3	PATCH	74
8.2.10.3.4	POST	76
8.2.10.3.5	DELETE	76
Annex A (informative):	Complementary material for API utilization	77
History		78

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Foreword

This Group Specification (GS) has been produced by ETSI Industry Specification Group (ISG) Multi-access Edge Computing (MEC).

Modal verbs terminology

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1 Scope

The present document focuses on the functionalities enabled via the Mp1 reference point between MEC applications and MEC platform, which allows these applications to interact with the MEC system. Service related functionality includes registration/deregistration, discovery and event notifications. Other functionality includes application availability, traffic rules, DNS and time of day. It describes the information flows, required information, and specifies the necessary operations, data models and API definitions.

2 References

2.1 Normative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

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The following referenced documents are necessary for the application of the present document.

- [1] ETSI GS MEC 001: "Multi-access Edge Computing (MEC) Terminology".
- [2] ETSI GS MEC 002: "Multi-access Edge Computing (MEC); Phase 2: Use Cases and Requirements".
- [3] ETSI GS MEC 003: "Multi-access Edge Computing (MEC); Framework and Reference Architecture".
- [4] ETSI GS MEC 010-2: "Multi-access Edge Computing (MEC); MEC Management; Part 2: Application lifecycle, rules and requirements management".
- [5] ETSI GS MEC 009: "Multi-access Edge Computing (MEC); General principles, patterns and common aspects of MEC Service APIs".
- [6] Void.
- [7] IETF RFC 5246: "The Transport Layer Security (TLS) Protocol Version 1.2".

NOTE: Available at <https://tools.ietf.org/html/rfc5246>.

- [8] IETF RFC 3986: "Uniform Resource Identifier (URI): Generic Syntax".

NOTE: Available at <https://tools.ietf.org/html/rfc3986>.

- [9] IETF RFC 7159: "The JavaScript Object Notation (JSON) Data Interchange Format".

NOTE: Available at <https://tools.ietf.org/html/rfc7159>.

- [10] W3C Recommendation (16 August 2006): "Extensible Markup Language (XML) 1.1 (Second Edition)", edited in place 29 September 2006.

NOTE: Available at <https://www.w3.org/TR/xml11/>.

- [11] IETF RFC 7230: "Hypertext Transfer Protocol (HTTP/1.1) Message Syntax and Routing".

NOTE: Available at <https://tools.ietf.org/html/rfc7230>.

- [12] IETF RFC 6455: "The WebSocket Protocol".
NOTE: Available at <https://tools.ietf.org/html/rfc6455>.
- [13] IETF RFC 6749: "The OAuth 2.0 Authorization Framework".
NOTE: Available at <https://tools.ietf.org/html/rfc6749>.
- [14] IETF RFC 6750: "The OAuth 2.0 Authorization Framework: Bearer Token Usage".
NOTE: Available at <https://tools.ietf.org/html/rfc6750>.
- [15] ETSI GS NFV-IFA 007: "Network Functions Virtualisation (NFV) Release 3; Management and Orchestration; Or-Vnfm reference point - Interface and Information Model Specification".
- [16] IETF RFC 5789: "PATCH Method for HTTP".
NOTE: Available at <https://tools.ietf.org/html/rfc5789>.
- [17] IETF RFC 7386: "JSON Merge Patch".
NOTE: Available at <https://tools.ietf.org/html/rfc7386>.
- [18] IETF RFC 8446: "The Transport Layer Security (TLS) Protocol Version 1.3".
NOTE: Available at <https://tools.ietf.org/html/rfc8446>.

2.2 Informative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

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The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

- [i.1] IETF RFC 5905: "Network Time Protocol Version 4: Protocol and Algorithms Specification".
- [i.2] IEEE 1588-2019™: "IEEE Standard for a Precision Clock Synchronization Protocol for Networked Measurement and Control Systems".
- [i.3] Protocol buffers, version 3.
NOTE: Available at <https://developers.google.com/protocol-buffers/docs/proto3>.
- [i.4] OASIS Standard: "MQTT Version 3.1.1", 29 October 2014.
NOTE: Available at <http://docs.oasis-open.org/mqtt/mqtt/v3.1.1/os/mqtt-v3.1.1-os.html>.
- [i.5] GRPC™.
NOTE: Available at <http://www.grpc.io/>.
- [i.6] OpenAPI™ Specification.
NOTE: Available at <https://github.com/OAI/OpenAPI-Specification>.
- [i.7] IETF RFC 4122: "A Universally Unique Identifier (UUID) URN Namespace".
NOTE: Available at <https://tools.ietf.org/html/rfc4122>.

3 Definition of terms, symbols and abbreviations

3.1 Terms

For the purposes of the present document, the terms given in ETSI GS MEC 001 [1] apply.

3.2 Symbols

Void.

3.3 Abbreviations

For the purposes of the present document, the abbreviations given in ETSI GS MEC 001 [1] and the following apply:

API	Application Programming Interface
DSCP	Differentiated Services Code Point
FQDN	Fully Qualified Domain Name
GRE	Generic Routing Encapsulation
GTP	GPRS Tunnelling Protocol
HTTP	HyperText Transfer Protocol
IETF	Internet Engineering Task Force
JSON	JavaScript Object Notation
MAC	Media Access Control
MQTT	Message Queue Telemetry Transport
NFVI	Network Functions Virtualisation Infrastructure
NTP	Network Time Protocol
PoP	Point of Presence
PTP	Precision Time Protocol
QCI	Quality Class Indicator
REST	Representational State Transfer
RFC	Request For Comments
RNI	Radio Network Information
RPC	Remote Procedure Call
TC	Traffic Class
TLS	Transport Layer Security
ToD	Time of Day
URI	Uniform Resource Indicator
UTC	Coordinated Universal Time
VNF	Virtualised Network Function
XML	eXtensible Markup Language

4 Overview

The present document specifies two MEC Platform Application Enablement APIs that support the requirements defined for Multi-access Edge Computing in ETSI GS MEC 002 [2], namely the MEC application support API and the MEC service management API.

Clause 5 introduces the functionalities enabled via the Mp1 reference point between MEC applications and MEC platform. It provides the high level information flows and describes the necessary operations.

The common data types are defined in clause 6, while the corresponding data models and API definitions are specified in clause 7 for the MEC application support API and clause 8 for the MEC service management API.

5 Description of the services (informative)

5.1 Introduction

The MEC platform, as defined in ETSI GS MEC 003 [3], offers an environment where MEC applications may discover, advertise, consume and offer MEC services. Upon receipt of update, activation or deactivation of traffic rules from the MEC platform manager, applications or services, the MEC platform instructs the data plane accordingly. The MEC platform also receives DNS records from the MEC platform manager and uses them to configure a DNS proxy/server.

Via Mp1 reference point between the MEC platform and the MEC applications, as defined in ETSI GS MEC 003 [3], the basic functions are enabled, such as:

- MEC service assistance:
 - authentication and authorization of producing and consuming MEC services;
 - a means for service producing MEC applications to register/deregister towards the MEC platform the MEC services they provide, and to update the MEC platform about changes of the MEC service availability;
 - a means to notify the changes of the MEC service availability to the relevant MEC application;
 - discovery of available MEC services;
- MEC application assistance:
 - MEC application start-up procedure;
 - MEC application graceful termination/stop;
- traffic routing:
 - traffic rules update, activation and deactivation;
- DNS rules:
 - DNS rules activation and deactivation;
- timing:
 - providing access to time of day information;
- transport information:
 - providing information about available transports.

These functions are grouped into those considered to provide MEC application support (i.e. application specific traffic routing, DNS rules and timing, as well as graceful termination/stop) and those that provide MEC service management (i.e. MEC service assistance and associated service transport information).

5.2 Sequence diagrams

5.2.1 General

Clauses 5.2.2 to 5.2.10 describe how MEC applications and/or MEC services may be supported by the MEC platform via Mp1 reference point. The related sequence diagrams are presented.

5.2.2 MEC application start-up

Figure 5.2.2-1 shows three alternative messages that a MEC application can use to communicate with a MEC platform during the start-up phase of the application instantiation process, steps 5 to 7 in clause 5.3.1 of ETSI GS MEC 010-2 [4].

In this flow, the MEC platform can verify the authenticity of the MEC application with the aid of an AA entity that contains the registration related information about the MEC application in question. For actual authentication, the MEC application uses access token based on OAuth2.0.

MEC platform also has possibility to verify the correctness of the service registration or services query of the MEC application, as it is assumed that MEC platform has received the valid configuration for service consuming and service producing MEC applications. The related information about this MEC application instance (including the required and the optional services, the services to be offered by this application instance and the associated transport dependency, the traffic rules and DNS rules associated with this application instance, etc.) can be compared to those included in the service registration or services query messages, which can be used to determine whether to accept or reject the request.

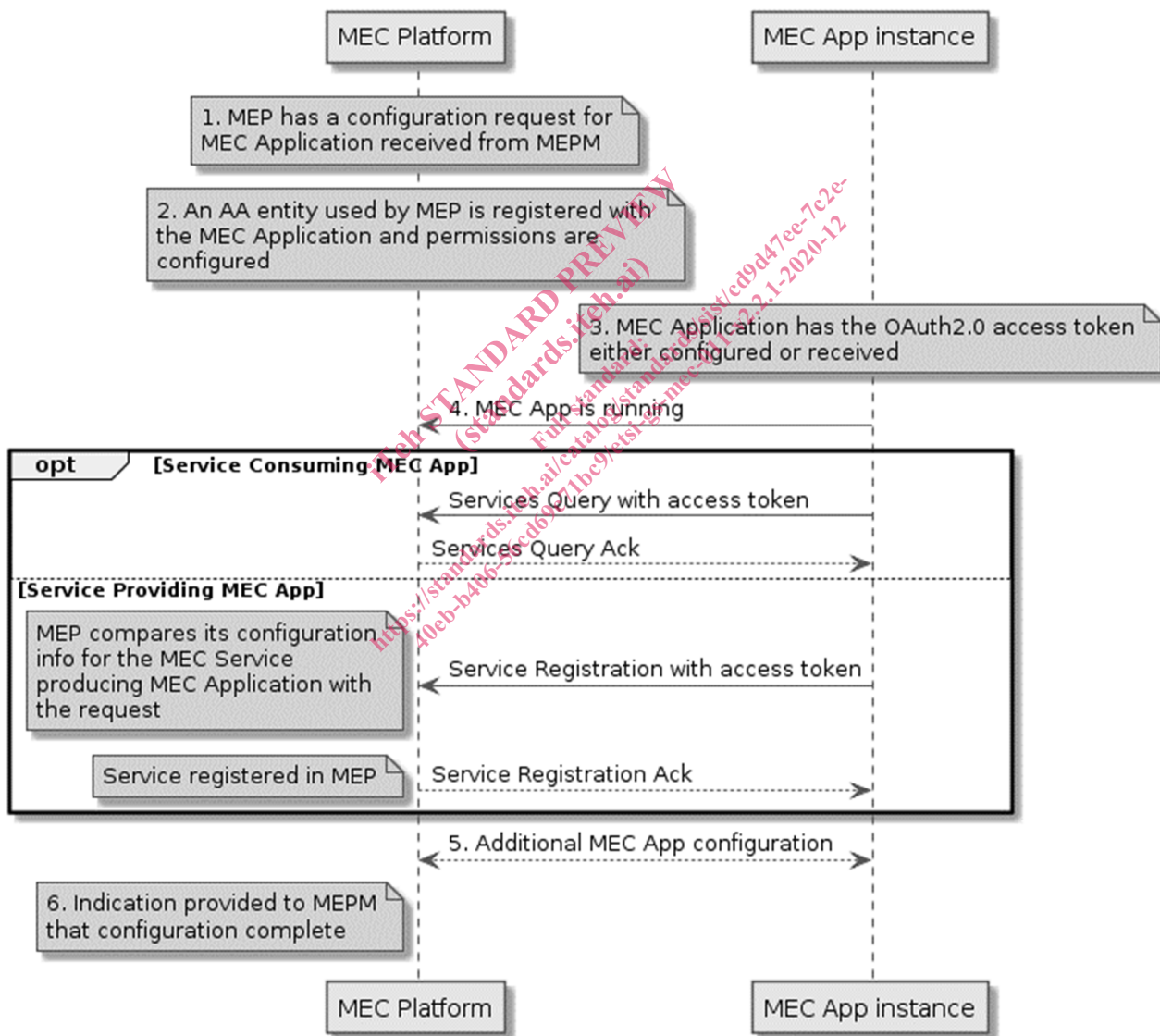


Figure 5.2.2-1: Flow of MEC application start up